

Postdoctoral position in motion and vibration analysis of TLP floating sub-station for offshore wind farms (F/M)

O/Ref: FEM-SAS-2023-048
24/02/2023

France Energies Marines institute

France Energies Marines is the Institute for Energy Transition dedicated to Offshore Renewable Energy (ORE). Its mission is to provide, enhance and nurture the scientific and technical environment necessary to overcome the obstacles facing this rapidly developing sector. With a multidisciplinary team of 70 employees and a model of public-private collaboration, the Institute has a raison d'être: R&D, whether it is collaborative or carried out as part of a service activity.

Context

[France Energies Marines](#) is conducting the AFOSS-DC project together with other partners: Centrale Marseille (Laboratoire de Mécanique et d'Acoustique), Chantiers de l'Atlantique, ENSTA Bretagne, Ifremer, RTE, RWE, SuperGrid Institute and TotalEnergies. This project aims to design a first architecture of floating offshore substation for direct current applications needed for future large offshore wind farms. Based on electrical topside defined in preceding work package, two concepts of floaters will be investigated, and basin test will be conducted to perform motion and vibration analyses.

Job description

In the framework of this postdoctoral position, the successful candidate will oversee the following tasks:

- Bibliographic analysis of existing Tension Leg Platform (TLP) concepts in oil & gas and offshore wind industry.
- Bibliographic study on existing regulations that are applicable to TLP platforms. At least API and DNV-GL rules will be explored.
- Selection of one geometry and creating a reference model in both CAD tool and FEA tool.
- Design optimization based on selected sea states of the selected installation sites to minimize the stress levels in the structure (hydrostatic stability, hydrodynamics properties and structural strength will be considered). CAPEX of the platform will be estimated based on cost models available in the literature. Some fatigue considerations will be regarded.
- Modelling of global model including the geometrical and material characteristics of the mooring: motion analysis (including low frequency motion), investigation of potential vibration sources (ViV, Sum-frequency forces, wave impact loads), vibration analysis considering rigid hull first, finite element modelling of the hull and apply pressure loads due to wave.
- Basin model test specification, reduced scale model design and manufacturing, test realisation, and results analysis. Comparison and calibration of numerical model.

The deliverables to be produced by the successful candidate during his/her work in the project are the following:

- A report describing the State-of-the-art study including the bibliography of TLP concepts, regulations analysis and calculation tools selection methodology.

- A section of a report describing the “optimal” designs. It will include drawings, results sheets, and some analysis of the results regarding the TLP design.
- A report including the model design and calibration (floater and tendons), sea states calibration (focused waves, regular and irregular waves), first order analysis, low frequency, springing and ringing analysis, experimental and numerical comparison.

The postdoc will be supervised by engineers and professors from ENSTA Bretagne, Ifremer and France Energies Marines.

Profile and skills

Initial training

- Thesis or PhD in naval architecture with emphasis on fluid-structure interactions
- Additional expertise in hydrodynamic and numerical modelling of offshore structures is greatly appreciated

Specific knowledge and skills

Required:

- Naval Architecture
- Hydrodynamic
- Structural analysis (mechanics)

Desirable:

- Fluid-structure interaction
- Mooring of offshore structure
- Knowledge of ORE system

Professional assets

- Excellent English skills
- Strict scientific rigor
- Adaptability to new disciplines
- Initiative, scientific curiosity and multi-disciplinary spirit
- Taste for research and teamwork
- At ease in expressing oneself, at convincing others and in communicating in a collaborative context

Practical information

- **Type of contract:** defined purpose fixed term contract
- **Duration of the contract:** 24 months
- **Starting date:** 21st August 2023
- **Application deadline:** 16 April 2023
- **Work location:** The position is mainly located at ENSTA Bretagne (around 70%) with periods of work at France Energies Marines headquarters (20%) and Ifremer (10% mainly during basin campaign test)

ENSTA Bretagne

FSI Laboratory
2, rue François Verny
29806 Brest - FRANCE

Ifremer

1625, route de Sainte-Anne
29280 Plouzané - FRANCE

France Energies Marines

Headquarters
Bâtiment Cap Océan
525, avenue Alexis de Rochon
29280 Plouzané - FRANCE

In accordance with the regulations, priority will be given to people with disabilities, with equal qualifications.

How to apply

- Applications must consist of a **CV** and a **cover letter**.
- In case of a candidate being seconded by a member of France Energies Marines, the application must mention the agreement of the current employer.
- To apply, please go to the France Energies Marines **website** under the [Join Us](#) section.
- For more information on this position, please contact: contactrh@france-energies-marines.org